

(fig. 4, Pl. VIII.) have concave articular facets turned towards, and nearly continued into, each other at their lower extremities; so as to form together a deep semilunar notch, into which the corresponding convex articular surfaces of the posterior oblique processes of the adjoining vertebra (fig. 3, Pl. VIII.) are firmly locked. In the close approximation of the two anterior concave articular facets, which are separated from each other only by a vertical ridge, and a rough surface of about three or four lines in breadth, the lumbar vertebrae of the *Macrauchene* resemble those of the Horse, and differ from those of the Camel-tribe and Ruminants generally, in which those surfaces are wider apart. In the hook-like form, however, of these articular processes the lumbar vertebrae of the *Macrauchene* differ from those of the Horse; and resemble those of many Ruminant species, and of the *Anoplothere*;<sup>\*</sup> but the degree of concavity of the articulating surface is not so great in the *Macrauchene*. It would be interesting to determine the relations which the lumbar vertebrae of the *Macrauchene* bear to those of the *Palæothere*; but the indication which Cuvier gives of the single lumbar vertebra, of which he had cognizance in the latter genus† is too slight to enable me to enter upon the comparison.

The whole length of the lumbar region in the *Macrauchene* is twenty inches. When the bodies of these vertebrae are naturally adapted together, they form a slight curve, indicating that the loins of the *Macrauchene* were arched, or bent downwards towards the sacrum. That the lumbar vertebrae were rigidly connected together, or but slightly flexible, is evident from the flatness of the articular surfaces of the vertebral body, and by the circumstance of ossification having extended along the anterior vertebral ligaments, and produced an ankylosis between the fourth and fifth lumbar vertebrae; (fig. 2, c, Pl. VIII.) This kind of ossification is frequent in aged horses, and I have seen an example of a similar ankylosis of the lumbar vertebrae, by abnormal deposition of bone in their anterior ligaments, in the skeleton of a Hippopotamus preserved in the Senkenbergian Museum, at Frankfort.

In preparing the preceding account of the cervical and lumbar regions of the vertebral column of the *Macrauchene*, I have felt frequently a strong desire to enter into a comparison between them and the corresponding vertebrae of the extinct Pachyderms of the Paris Basin. Some of these, as the *Anoplotherium gracile*, in the length and slenderness of the cervical vertebrae, resemble both *Auchenia* and *Macrauchenia*; others, as the *Palæotherium minus*, and probably the rest of the genus, resemble the *Camelidae* and *Macrauchenia* in having seven lumbar vertebrae. Cuvier points out the resemblance which the atlas of the *Anoplothere* bears to that of the Camel, and especially of the Llama;‡ but he

\* Cuvier, Ossements Fossiles, iii. p. 238.

† Loc. cit. p. 234.

‡ Loc. cit. p. 235.

expressly notices the existence of the canals for the vertebral artery in the fifth or sixth cervical vertebra of the *Anoplotherium commune*.<sup>\*</sup> Do the cervical vertebrae—say from the third to the sixth inclusive—of the *Palæotherium* present an imperforate condition of their transverse processes, or exterior part of their sides? Cuvier, who seems not to have been aware of this peculiarity in the *Camelidae*, merely notices the absence of these arterial foramina in the last cervical vertebra of the *Palæotherium minus*,† which, unfortunately for the comparison I am desirous of establishing, is that which most commonly presents this imperforate condition in the Mammalia generally. As, however, the cervical vertebrae of the *Palæothere* had the anterior articular surface of the body convex, and the transverse processes produced into descending laminae, it is most probable that they corresponded with the cervical vertebrae of the typical Pachyderms in the condition of their arterial foramina.

The sacrum and ossa innominata in the present specimen of *Macrauchenia* are very imperfect; but sufficient is preserved to show that the sacrum was ankylosed to the ilia: the lower boundary of this ankylosis is marked below by an external ridge, and by vascular canals and grooves in the substance of the bone, as in the Hippopotamus. The body of the sacrum is lost, but the smooth articular convexities upon the transverse processes adapted to the articular depressions of the last lumbar vertebra are fortunately preserved.

The remains of the anterior extremity of our *Macrauchenia* include fragments of a left scapula; the proximal extremities of the ankylosed bones of the right antibrachium; the metacarpal and most of the phalangeal bones of the right fore-foot. The first-mentioned fragments, include the head and neck of the scapula, a small part of its body with the beginning of the spine, the coracoid process, and the nearly entire glenoid cavity. This articular surface (fig. 2, Pl. IX.) resembles in its general form, and degree of concavity, that of the Camel and Rhinoceros, and is deeper than in the Hippopotamus. The coracoid process is represented by a slightly produced rough, thick, and obtuse tuberosity, situated closer to the glenoid cavity than in the *Camelidae* or *Rhinoceros*, and having almost the same relative position and size, as in the *Palæotherium crassum*. The superior border or costa of the scapula presents much variety in the Ungulate quadrupeds with which we have to compare the *Macrauchenia*. In the Ruminants its contour forms behind the coracoid a concave sweep, which advances close to the spine of the scapula. In the Camel and Horse the marginal concavity is shallower, and the distance of the superior costa from the spine of the scapula is greater; the extent of the supra-spinal fossa increases in the true Pachyderms, and the *Macrauchene* agrees with them in this structure. In the Tapir, how-

\* Loc. cit. p. 237.

† Loc. cit. p. 232.